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# **Amtrak PTC Update**

**NTSB Forum – Washington, DC**

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# Amtrak PTC Update

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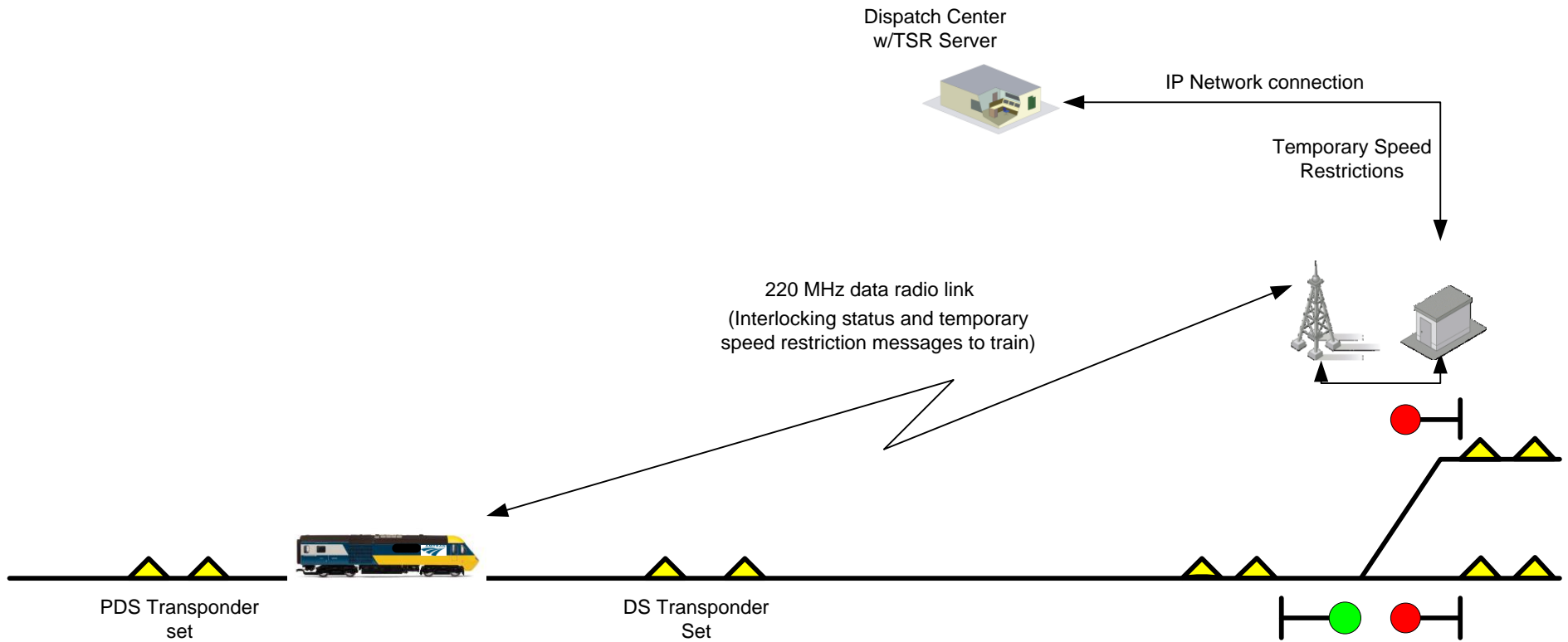
- Northeast Corridor Update
  - ACSES
  - I-ETMS® Interoperability
- ITCS
  - Porter, IN to Kalamazoo, MI
  - Kalamazoo to Dearborn
  - ITCS on other Corridors

# ACSES Background

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- 1998 – FRA Issued an Order of Particular Applicability requiring that in addition to ATC Amtrak install a system that would:
  - Enforce a positive stop at interlocking home signals
  - Enforce all permanent civil speed restrictions
  - Enforce all temporary speed restrictions (TSR)
  - The system was required between New Haven, CT and Boston and anywhere else on the NEC that speeds were above 125 mph
- 2000 ACSES first installed in New England without a data radio
- 2004 Data radio added for positive stop release
- 2009 Began delivery of TSR data by data radio
- 2010 FRA granted the first PTC type approval and certification for ACSES

# ACSES Overview



# Enhancements for Interoperability

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- New Locomotive Display
  - FRA approved variance in 2012
- New Data Radio Communication System
  - Replacing 900 Mhz data radio system with a 220 MHz data radio for:
    - Better coverage and reliability
    - Time slot management to accommodate commuter usage
    - Requires FRA variance approval (expected by summer 2013)
- New WIU to replace original ACSES encoders
  - Requires FRA variance approval (currently working with FRA)
- Other interoperability issues with the commuter railroads operating on the NEC
  - These changes will take place as the commuters roll out their systems

## Where are we?

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- Approximately 95% of the transponders on the NEC have been installed and tested
- All of the new radio houses and antennas have been installed
- Amtrak is in the final stages of obtaining radio spectrum in New England
- RADIO SPECTRUM IS AN ISSUE ON THE REST OF THE NEC
  - FCC advises to purchase spectrum on the secondary market
  - The secondary market is a BIG MESS

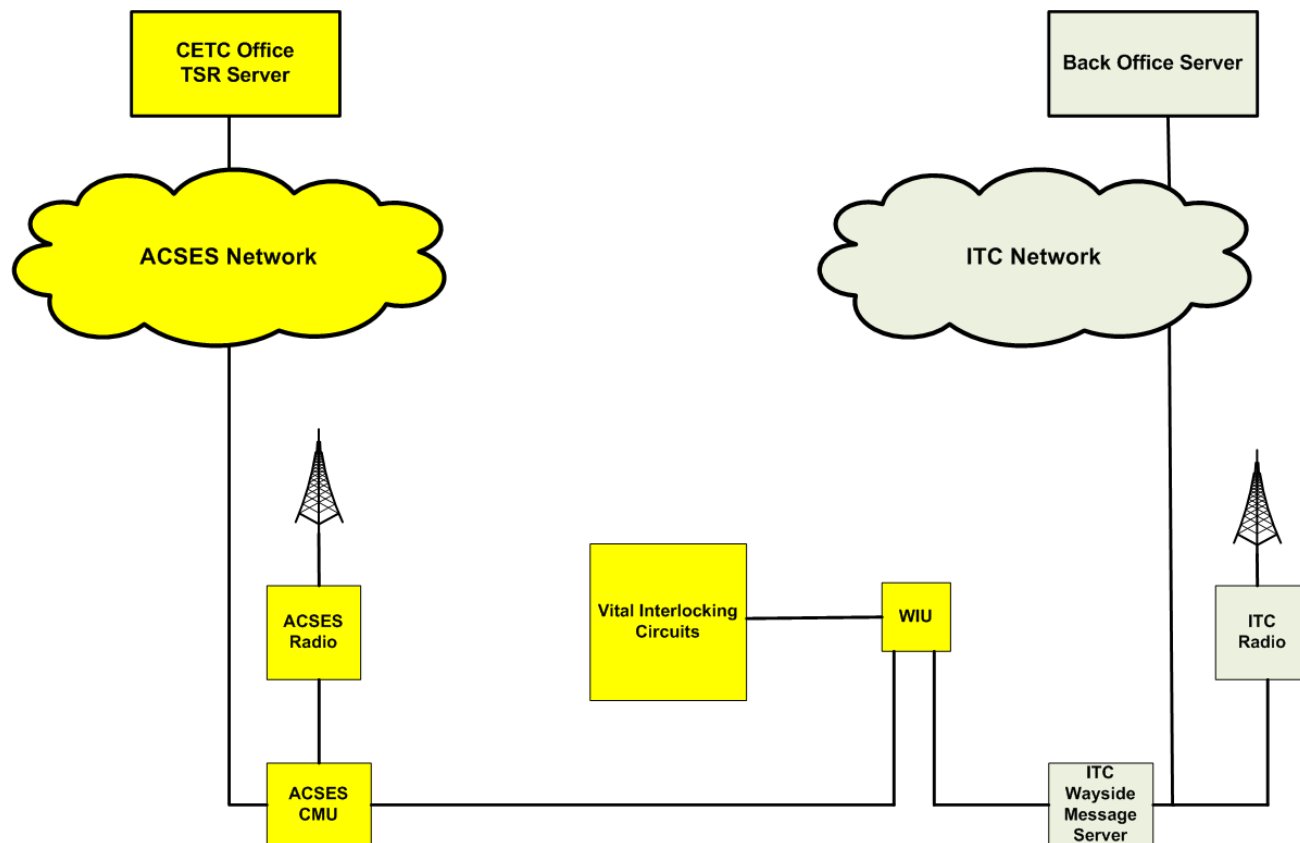
# Implementation Strategy

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- Once FRA approves the new communication system we will turn on the new data radio system in the existing ACSES territory
  - Data radio replacement will begin on our locomotive fleet
  - Once all locomotives are upgraded we will begin turning on ACSES in the new territory
- As the commuter railroads begin to roll out their system we will implement other interoperability changes

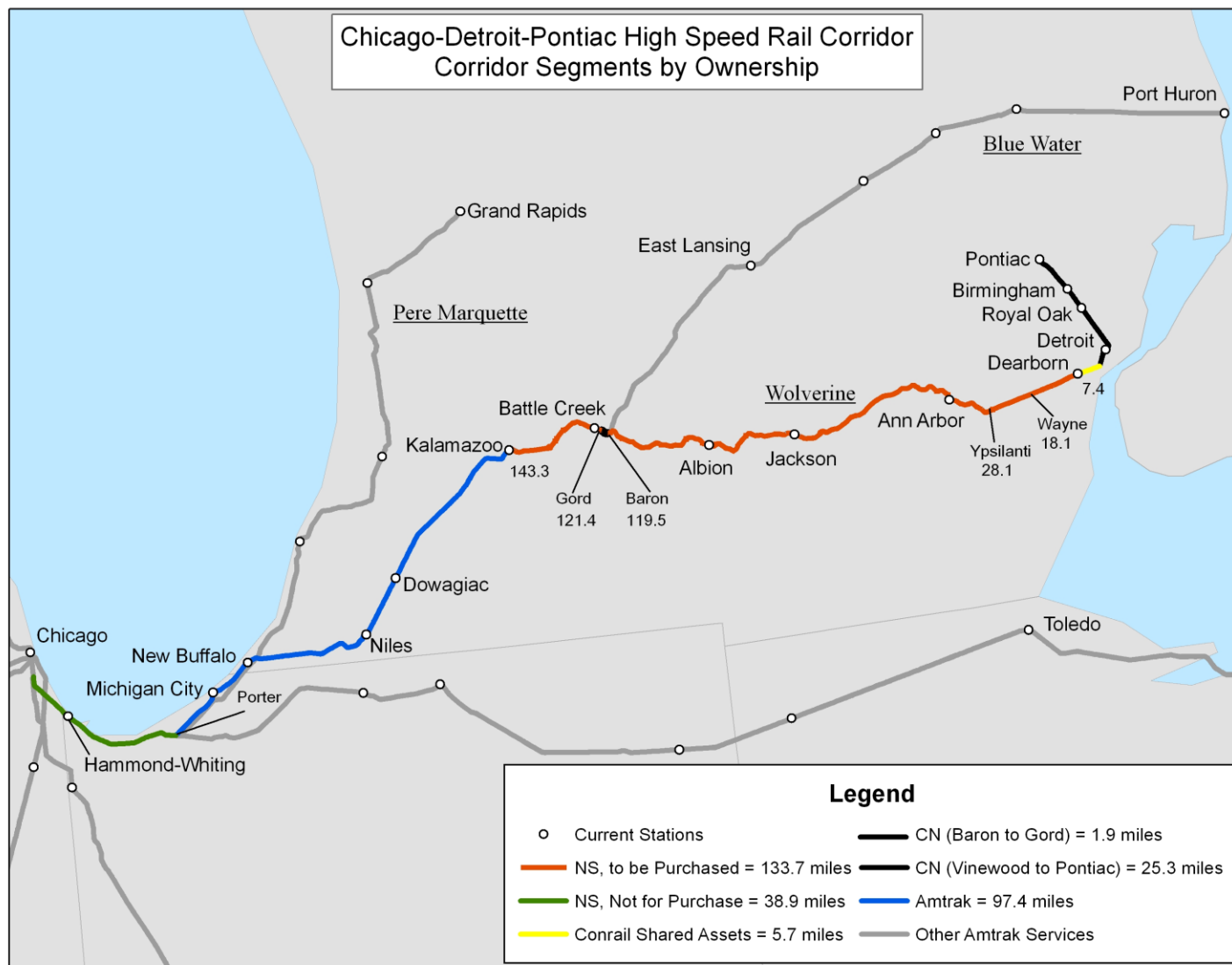
# ACSES – I-ETMS® Interoperability

- Parsons has been given a contract as a Systems Integrator for an I-ETMS® overlay on the NEC
- ACSES and I-ETMS® will operate in parallel as two completely different systems





# ITCS on the Michigan Line



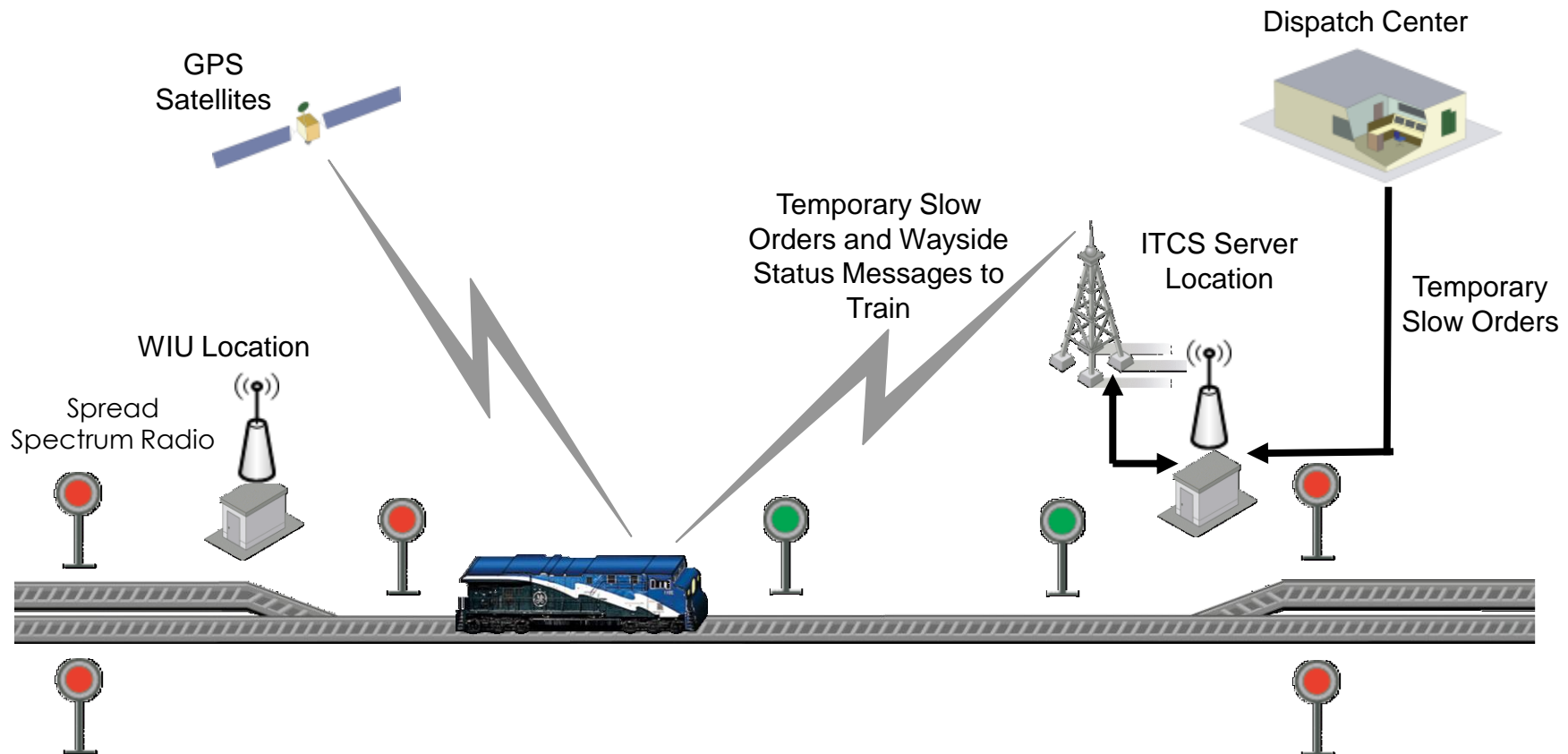
# ITCS Background

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- 1995 - The ITCS grant was awarded to the State of Michigan
- 1996 - A 100 mph demonstration train was run on 20 miles of track east of Niles, MI
- 2001 - ITCS was placed in service on about 60 miles of the Michigan Line with enforcement at 79 mph
- 2002 - FRA approved speeds to be raised to 90 mph
- 2003 - FRA required a third party Verification and Validation (V&V) of the System
- 2005 - FRA allowed speeds to increase to 95 mph
- 2011 - ITCS was expanded to include the entire route between Porter, IN and Kalamazoo, MI
- February 2012 FRA approved a speed increase to 110 mph.
- **February 7, 2012 Amtrak began scheduled service at 110 mph.**

# ITCS Original Concept

- Communication between outlying locations & server was via spread spectrum radio



# Original ITCS Installation

Servers collect wayside data, and talk to the trains



ITCS Server housed in existing infrastructure or small add-on boxes



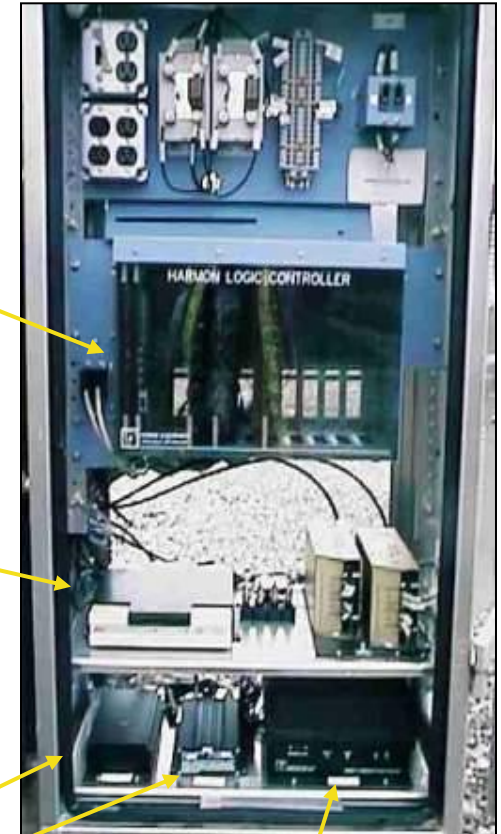
MCP Radio Antenna  
(Talk to Train)

GPS Antennas

ITCS RBC/Server

Spread Spectrum  
Radio  
(Talk to Wayside)

ITCS Server Hardware



GPS  
Receivers

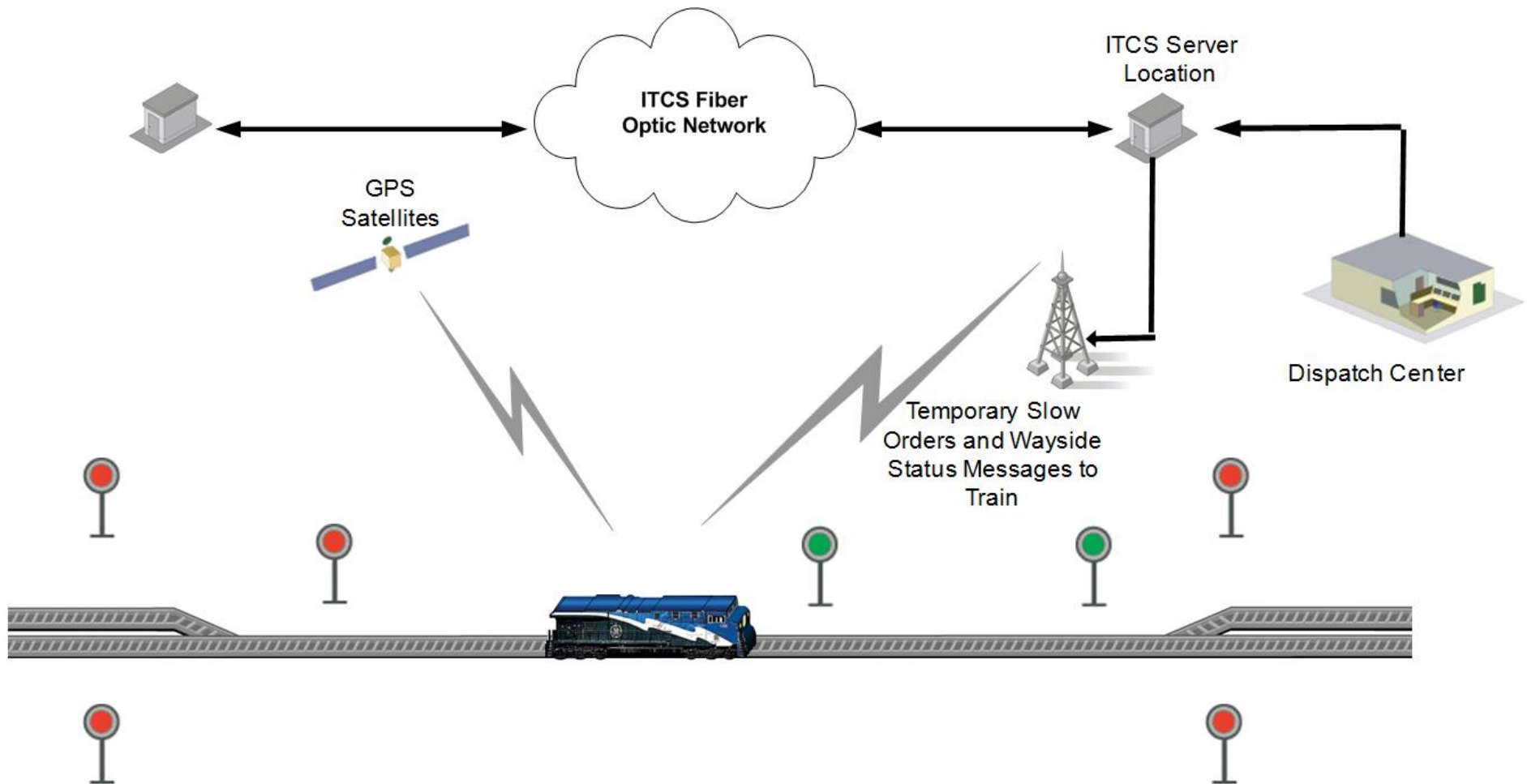
MCP Radio  
(Talk to Train)

# New Concept ITCS Installation

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- With the expansion of ITCS territory on the Michigan Line in 2011 we applied new design concepts
  - Installation of a fiber optic system eliminated the need for spread spectrum radio communication between outlying locations and server locations
  - The signal system was upgraded/replaced using GE EletroLogIXS® controllers at signal and crossing locations with an integrated WIU
- This approach will be used on the Michigan Line East project (Kalamazoo to Dearborn) for the recently acquired portion of the line by the state of Michigan

# ITCS Overview – New configuration





# Integrated ITCS Location installed in 2011



# Michigan Line East ITCS – I-ETMS Interoperability

